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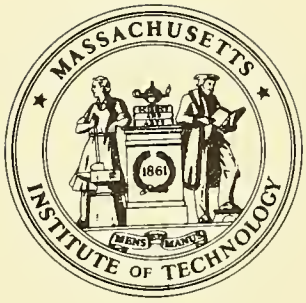

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The Investment Decisions of Colombian Community Boards*

by

Matthew Edel

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*The views expressed in this paper are the author's sole responsibility, and do not necessarily reflect those of the Department of Economics, the Massachusetts Institute of Technology, nor the Foreign Area Fellowhsip Program, under whose auspices the initial data collection was carried out.

The Investment Decisions of Colombian Community Boards

Matthew Edel*

A. DETERMINANTS OF INVESTMENT IN PEASANT ECONOMIES

Peasants have often seemed an undifferentiated group of "rural men in ragged clothes carrying machetes." (Mintz, 1967) A similar viewpoint has been apparent at times in generalizations about peasant economic behavior. All peasants, according to some economists, are rational optimizers who happen to be faced with limited and unchanging opportunities. (Schultz, 1964; Firth and Yamey, 1964) Others, however, allege that peasants do not react as the maximizers of economic theory, but rather have some pattern of limited wants. (Polanyi et al.; Boeke, 1953) Neither simple picture has sufficient explanatory value. The institutional and environmental situations faced by peasants vary, as do their readiness to innovate and their conformity to the ideal-type of traditional personality. (Hagen, 1962) Supply responses, investment and innovation may vary among peasant groups; analysis of possibilities for change must take these differences into account.

Recent studies in a number of countries indicate that individual peasant cultivators respond to product price changes, to factor costs, and to nonagricultural employment opportunities. (Krishna, 1967) These findings suggest that to some extent decentralizing decisions through a market mechanism may be effective policy in dealing with peasants. Yet, in some circumstances, social structures, cultural preferences, or limited perceptions may limit the degree to which innovations acceptable from an economist's cost-benefit standpoint will actually be introduced. (Spicer, 1964) Similarly, the study of community development and works programs indicates that decentralization through the development of community institutions may mobilize resources for development. (Edel, 1968; Papanek, 1967) Yet there are also cases in which these programs have not achieved progress. (Nair, 1961) Clearly a more detailed analysis of peasant behavior is required than the

simple hypotheses that all of these cultivators either are or are not maximizers.

A possible technique for such an investigation involves comparison of responses by different groups of peasants to some opportunity to invest, when both preferences and personality, and potential profitability of the investment are variables. These factors are sometimes referred to as social and economic, respectively, but either set is amenable to both social and economic analysis. From the viewpoint of economics, they can be seen respectively as factors determining a "supply" curve of innovative investment and a "demand" curve of opportunities intersecting with it. Such an approach has been suggested in the case of industrial entrpreneurship by Harris (1966) and Glade (1967).[1] It will here be applied to what might be termed "community entrepreneurship" among Colombian peasants: their willingness to undertake and invest in local voluntary public works projects under that country's Acción Comunal program.

This community action program was established in Colombia in 1958. Under its provisions, the residents of localities (such as peasant villages or the dispersed settlements called veredas in Colombia) may elect boards, Juntas de Acción Comunal, to undertake construction projects (roads, schools, water supply, etc.) and provide other services (e.g., adult education programs, collaboration with public health drives) at a sub-municipal level. The boards normally select their own projects, and rely on voluntary labor and cash donations from residents for their work. Government agencies often contribute more than half of the costs to the projects; but these grants are usually made on the initiative of the communities, which have to lobby for them vigorously. As a result, total investment (including government subsidies) can be taken as an indication of the extent of community effort in this (for Colombia) basically innovative activity.

This paper presents an analysis of community responses, based on a sample of ninety-six rural communities. Data on investment in community capital projects for the years 1964 and 1965, and for a number of social and economic variables presumed related to the rate at which communities would respond and invest, was gathered by

means of interviews with key informants.[2] These included presidents and other officers of community boards, and Colombian and Peace Corps promotores (extension agents) who worked with the communities. Data was analyzed by means of simple averages and by means of multiple regression analysis using several combinations of explanatory variables to indicate their relation to the dependent variable of family investment in Junta projects during the period. Several specifications of the regression are presented in the text and the appendix.

The model underlying the statistical analysis is that of the interaction of opportunities for community investment and ability to respond (conceptually, a "demand" and "supply" for community activity). The opportunities would be affected by such factors as potential profitability of roads due to commercial involvement of the communities, the potential return to schooling (related to ownership of farms on which decision-making could be improved, as well as to opportunities to migrate), the prior lack of these facilities in communities, and the ability to invest out of money incomes or seasonal labor surpluses. Similarly, the ability to respond would presumably be affected by personality types, by openness of communication, and by historical experiences.

Not all of these factors can be measured directly, especially when observation is limited to a few key-informant interviews in each community, rather than to an exhaustive socio-economic case study supplemented by a battery of projective tests. In Colombia, such factors as the region in which a community is located are presumed to correlate with modal personality types, while land tenure or labor market conditions may in part serve to index opportunities. These are variables obtainable in brief visits to communities, and are used in the regression analysis, although with the realization that the degree to which behavior is explained is lower than it would be were more directly related variables used. Several other difficulties may be mentioned. Use of an ordinary least squares

regression on what is essentially a "reduced form" model, may overlook non-additive interactons between the variables (which might be expected if opportunities and responsiveness do interact like supply and demand), and possible "feedback" effects of the projects onto the explanatory variables (a less likely possibility due to the recent beginnings of Acción Comunal). Bias may be introduced through the use of imputed cash construction costs of projects as dependent variables, making communities that lowered the costs of their projects through greater efficiency appear as smaller investors.

As might be expected from all of these considerations, the observed values of R^2 have not been extremely high. However, they are significant enough, as are some of the regression coefficients, to suggest that relations do exist between the variables considered. They indicate also that both potential social profitability of the projects, and the "social" variables of personality, perception and preferences are factors in determining the investment or innovation rates of different communities. The various factors considered are discussed below.

B. REGIONAL PATTERNS OF RESPONSE

The most striking internal variations in Colombia are the extreme inter-regional differences in climate and culture. In a mountainous country in the tropics, each thousand meters of altitude involves an entirely different range of temperatures, crops, topography, foods and housing patterns. Some differences in racial and cultural aspects of the population accompany these changes. Colombians feel these differences keenly: the regions consider themselves rivals and view the residents of other areas in terms of uncomplimentary stereotypes.

Many Colombians believe that residents of the hot country areas (0-1000 meters) are disorganized and lazy; that those of cold zones (over 2000 meters) are naturally conservative and closed to new ideas; and that the inhabitants of

one of the more important areas of intermediate climate (Antioquia) are grasping, overly-ambitious economic operators. These beliefs affect the actions of national policy makers, and may influence such allocative decisions as where to send promotores. The mythology that has grown up in this regard, and its effects on policy, make it difficult to interpret regional variation in behavior. Yet this factor cannot be ignored. Differences between regions in their responses to community development can be measured. The intermediate zones appear to have made the most investments. In the sample of boards, those in communities of intermediate climate (1000-2000 meters) invested more both of their own funds and of funds received from public agencies than did boards elsewhere. These figures are analyzed in Table I. The differences between the intermediate regions and other regions are substantial, but due to the high standard deviations of the figures, only the difference in the local contributions between intermediate climate zones and hot country communities is significant at the .05 level.[3]

The superior investment levels of the medium climate zones may perhaps be due to an underlying clutural difference. Part of this region (the Department of Antioquia and adjacent areas settled by Antioqueños in the late nineteenth century), has led Colombian development during the past century, both in coffee cultivation and industrialization. Hagen (1962) considers the predominance of the Antioqueños as entrepreneurs as arising from factors of personality developed in the early history of the region. These differences may account for part of the difference in community investment, but it is hard to show they are the most important factors. First, the region of greatest response includes not only Antioqueño areas but also Huila and Tolima, which are generally viewed as backward, and parts of Santander, which was one of the most developed zones in Colombia in the colonial period, but which suffered an economic decline in the nineteenth century. Second, when other factors apart from region are taken into account, the additional explanatory power of region-

TABLE I

Regional Differences in Community Action Investment (1964-1965)

	TOTAL INVESTMENT IN JUNTA PROJECTS			CONTRIBUTION BY THE COMMUNITY		
	Intermediate Climate	Cold Climate	Hot Climate	Intermediate Climate	Cold Climate	Hot Climate
Mean Investment (pesos/ family)	282	223	181	139	93	58
Standard Deviation	388	227	341	182	100	84
Size of Sample	48	20	28	48	20	28
Difference in Relation to Inter-mediate Climate Zone	---	59	101	---	46	81
t-value of difference	---	0.78	1.19	---	1.32	2.46

Source: Key informant sample of communities, 1966. All figures in pesos per family covering two year period 1964 and 1965. All values of t have at least sixty degrees of freedom.

al location in predicting community investment is slight.

Table II presents a multiple linear regression, using data from the sample of communities, to explain the investment made (in pesos per family) in Junta projects during the period 1964-1965. The analysis takes into account a number of economic factors (wage rate, land ownership, occupational division and crop concentration) and several demographic and communications factors of the communities. The regression has an R^2 of .349 with F = 4.57 on 10,85 degrees of freedom, statistically significant at the .01 level.

This equation provides a second possible explanation of differences in investment levels, which does not depend on regional psychological factors. If variables for location of the community in hot, cold, or intermediate climate are added to the regression, the explanatory power (R^2) is only increased to .355. (See Appendix, column 3.) These alternative explanations for intercommunal variation pose the problem of interpreting whether regional character or the set of variables used in Table II represent the original cause of differences. It is conceivable that regional personality types have been factors in the determination of the alternative "causes." Even if this is true, however, use of the regression variables allows a more comprehensible theory of causality than that in which climate or a few regional stereotypes of character are held to result directly in the differences.

C. EFFECTS OF "THE VIOLENCE"

Of the alternative factors affecting community investment, statistical analysis indicates the location of the community in an area in which rural violence was strong in the late 1950's as perhaps the most significant positive influence. This factor overlaps somewhat with region. Of the communities in the sample, 70% of those in the intermediate altitudes were affected by the violence, but only 25% of the hot country communities and 30% of the cold climate communities

TABLE II

Factors Affecting Community Action Investment

TINF =	122	+	201 VIOL	+	231 KONS	-	31 FAMS	-	23 HOUR	
	(0.68)		(2.72)		(2.70)		(2.21)		(1.66)	
+	82 PROM	+	197 RAD	+	329 MKT	+	182 FARM	-	315 LABR	
	(2.87)		(1.36)		(2.03)		(1.35)		(1.89)	
-	15 WAGE									
	(1.02)									

R^2 = .349; N = 96; D.F. = 85 Figures in parenthesis: T-statistic

Note: Based on key informant data on 96 communities. The variables used in this and subsequent regression are:

TINF = Total Investment in Projects of Community Boards
OWNT = Local contribution to this investment
AIDT = Government and outside contribution to this investment
VIOL = Dummy variable for community in Violence area
FAMS = Population in hundreds of families
KONS = Concentration of settlement pattern (proportion living close enough to hear a loudspeaker if one were installed in center of community)
HOUR = Distance from Departmental capital in hours
PROM = Years of Community Development Promotion received
RAD = Proportion of families with radios
LIT = Proportion of famly heads literate
KMS = Distance to municipal seat, in kilometers
MKT = Proportion of gross income from principal marketed crop
FARM = Proportion of families owning farms of more than three hectares
LABR = Proportion of family heads whose principal income source is wage labor
WAGE = Wage rate in pesos, 1964

HOT = Dummy variable for community in hot climate
COLD = Dummy variable for community in cold climate
COF = Dummy variable for coffee-growing community
LVi = Dummy variables for levels of services available (i = 1,2,3,4,5) None punched for i = 0

All figures are in pesos per family, for the period 1964-1965.

were so involved. Since, according to the regression analysis, communities that had been in the zone of violence invested approximately two hundred pesos per family more than those that had not, more than two-thirds of the difference between the investments made in communities of medium climate and those in other zones can be accounted for statistically by the differences in the prevalence of violence in the different zones.

The positive impact of violence on investment may seem paradoxical, since it would be assumed to have set communities back in their level of development, disrupted their morale, and drained them of potential leadership through death or emigration. But rural violence in Colombia has been of a particular form. It involved a decade of complete disruption; first a civil war between the two traditional political parties and then a period of banditry in which communities had to band together to defend themselves. Sociologists who have studied this outbreak, known to Colombians as "La Violencia" (The Violence), have concluded that it led in fact to a greater ability or desire to develop among those affected. Lipman and Havens (1965) found that migrants from Violence areas differ from other poor workers in Bogota in having a higher degree of identification with the Colombian nation, as well as greater feelings of insecurity and anomia. Even these last feelings, because they developed since

> all of the old acknowledged institutions to which he has formerly turned for guidance seem powerless to stem the Violencia or to provide support for him in the threatening world

require the victim of the Violence to break with the past. Similarly, Torres (1963) has suggested the Violence affected social change by breaking down a static rural society and bringing new influences into the lives of rural folk. Isolation was ended and the view that the world was unchanging was destroyed. New self-defense groups required a divison of labor and new people were given a chance for leadership. A spirit of group identity developed; the old political sectarianism and pure individualism gave way to class consciousness and

community solidarity among the peasants. Guerilla and bandit groups provided a sort of upward mobility which, when peace was restored, left the people with a demand for further, more legal, channels of mobility.[4]

This hypothesis is not obvious in the abstract, although it does accord with the experience of social change in turmoil in other countries. (Patch, 1966; Fanon 1963) But it is confirmed almost immediately by contact with Juntas in the regions in which violence was most pronounced. Leaders in these areas, although suffering some feelings of frustration, which could be considered anomic, and skeptical of the political parties (which they tend to blame for the Violence), are not without hope of advancing by some means or other, and they feel that the unity of the peasants can be a factor in advancement--perhaps more important than help from outside.

That such an attitude leads to experimentation with new institutions like the community action board, and to more investment is not hard to envision. But the exact magnitude of that effect is not easily judged. It is clear from the data that the higher levels of investment are not simply the result of possibly higher levels of subsidy and promotion by the government to violence areas. Each is treated by a separate variable in the multiple regressions, and the Violence has not affected subsidies nearly as much as it has increased communities' own contributions (see Appendix). Similarly, the hypothesis that communities invest more because the Violence destroyed part of their social overhead capital—and they wish to restore earlier levels--does not seem sufficient. Addition of variables for community facilities available (LV_1 through LV_6 in Appendix) does not appreciably change the coefficient on the dummy variable for presence of the Violence. However, a third difficulty is possible: the Violence itself may have been most severe in regions where there was already a strong local spirit of the sort that later emerged as important in community action. (Guillen Martinez, 1963; Fals Borda, 1965) Just how much violence was an outlet for existing ambitions, and how much it created new ones, may never

be known precisely. But the latter effect appears to have been important; the Violence has been a factor of at least some influence in the later success of community action.

D. PROMOTION AND COMMUNICATION PATTERNS

If only ancestral traits of regional character or the trauma of the Violence could account for the ambition or for the perception of opportunities needed for community investment, little policy could be recommended for fostering local economic growth. However, proponents of community development argue deliberate programs of social change can be carried out in part by giving people with existing ambitions the organizational tools to make their work effective, and in part, by helping others to visualize change as possible. These programs require communication of both techniques and the idea of progress. In Colombia, primary reliance for this is placed on professional promotores. But other means of mass communication and word of mouth are also employed.

Many varieties of promotion are employed in Colombia. Several agencies with different goals are involved, and individual promotores have slightly different manners of working with communities. Some are project-oriented, seeking to secure the construction of as many roads or buildings as possible in a short time. Others are educationally oriented, scorning projects not entirely organized by the communities themselves, and concentrating on making people more aware of their own and the communities' potentialities. A few become charismatic leaders; others prefer to remain less conspicuous catalysts for change. There is no general criterion for who will make the best promoter, although some preliminary psychological investigations have been carried out for the Peace Coprs. (Stein, 1966) Probably different approaches are appropriate in different cases.

The present data does not allow consideration of such detailed factors as the personality of promoteres. For statistical purposes, all promotores were

considered equally. Situations with and without promotores have been compared, including a variable for the number of years promotores had been working with each board in the sample; it was found that their presence did significantly raise the amount of investment that took place. Each year of contact raised the value of investments, per family, by about 80 pesos. A closer analysis using the regressions presented in the Appendix indicates further aspects of this impact. In the first place, the impact of the communities' own contribution to the investment was only about one-third of the total increase induced. The rest came in the form of outside aid. Clearly, one of the more important things promotores were able to do in communities was to help them in their dealings with government agencies. Regionally, there was also variation in the role of promotores. The increased investment induced was greatest in hot climate communities, where there were the fewest other factors encouraging more investment, and lowest in those in the intermediate region. Finally, there was variation encountered in terms of the date at which promotion began. Using different variables for different calendar years in which promotion took place, it was discovered that there was a lag between the date at which promotion began and the date at which results began to be apparent. In part this may be due to normal planning lags in projects already decided upon, but it seems also to indicate the importance of promotores having a sufficiently long time to be able to work with communities for their impact to be felt.

The differential returns in communities with and without promotores may to some extent underestimate the global effects of promotion, since the activities of a promotor do not only affect the community with which he is actually working, but may lead to results elsewhere as other communities hear of what has been accomplished in the first location. There effects cannot be measured, but some of the other results of the regression analysis do indicate, at least, that other factors of communication may have been important as well in spreading the message of community action. The number of radios in a community, and

proximity to the departmental capital, affect investment positively. The more communication channels opened, it would appear, the more investment. An attempt was made to discover the effects of literacy on investment. A variable for newspaper readership added to the equation was not significant, but this may be due to difficulties of a key-informant approach for discovering actual newspaper readership. This is one area in which, for the good name of his community, a leader may easily be tempted to exaggerate. One final communications variable, the degree to which community residents live near to each other, does not appear to have had much of an effect on the communities' own share of investment. But nucleated settlements do, for other reasons probably related to their political visibility, receive more funds from the government.

E. COMMUNITY ECONOMIC BASES

Investment by the Junta de Acción Comunal is also affected by the economic base of a community. Different areas in Colombia vary as to the composition of land tenure between independent small farms, large plantations, minifundia, and other types of property. Some regions are densely populated enough to satisfy the model of "surplus" labor; others are relatively empty areas, some of which are receiving in-migrants. Some communities are dedicated to the production of one marketed crop; others market a diversified range of output, while some are nearly closed and self-sufficient economic units. The minifundio of cold country; the small coffee farm of the intermediate zone; and the latifundio of hot country are all in some sense typical. But there is considerable variation within the major regions, and even within municipalities. These variations affect community investment.

Economic factors can shape investment opportunities by affecting the resources available for possible investment, or through the possible benefits of the complete investment. The same factor may work in separate directions on the supply and the demand side: a higher income may mean that more may be saved

for investment purposes, but at the same time that there is less urgency to the need for the additional revenue the investment may bring. A low wage rate can indicate that surplus labor will make investment less costly in its labor components, but at the same time the poverty it indicates can make cash investments harder to make. Furthermore, different economic activities may feed back on such non-economic factors as the ability to perceive new opportunities. Thus, the interpretation of the effects of some economic factors is not easy.

Nonetheless, the regression analysis and less formal observations while taking the sample indicate the role of some economic factors in explaining levels of investment. Surplus labor, the factor of most importance in the literature, seems to have a positive effect on investment, but one less strong than some theorists might expect. Rural wage rates, a possible proxy for labor scarcity, are negatively related to community investment. But the increase in investment per family from each peso less in the wage rate is very small, and the level of significance of the variable is not high. However, those are cash wage rates. Due to price differentials, they may not accurately represent real wages. Experience in a number of communities indicates that labor availability is, as hypothesized, a much more important factor than this statistic might indicate, but that the most important labor availabilities are <u>seasonal</u> ones. Even where a community is short of labor at some seasons, it may have spare time part of the year which is sufficient for projects. A single-dimensioned variable like the wage rate cannot indicate the magnitude of this effect.

The extent to which a community is dependent on its principal cash crop is also positively correlated with project investment. Closer analysis reveals that market specialization has more influence over the amount of aid that a community receives from the government than over local contributions. In fact, it is positively related to local contributions only in the intermediate climate zone. Market orientation may increase investment due to the greater usefulness of roads, and some other projects, as trade increases. But, commercialization

may be related to a change from "folk" to "urban" attitudes. While this change might lead communities to want more new services, it would also make them likely to seek at least partial aid before launching a project. These communities are also more closely tied to outside interests, and hence are in a better position to approach the government for assistance. This would be particularly true in the intermediate climate region, where the Federation of Coffee Growers itself makes contributions to communities dedicated to the production of that crop. In the coffee region, furthermore, increased crop concentration is likely to mean both a higher disposable cash income and a higher degree of seasonal labor surplus than that in other communities. Both factors might facilitate investment. On the other hand, in hot country, increased commercialization may be related to a greater influence of large farms and a migratory inflow at harvests, rather than to a local availability of labor in off-seasons.

Land tenure and occupational distribution also affect the response to community development. In general, communities of small farms are more active in community action than are groups of rural wageworkers or areas of large farms. The small farmer would be expected to have more of an income above subsistence to invest and more stake in the permanent betterment of his community than a landless laborer. Promotores working in areas with considerable wage-earning populations state that the unstable pattern of residence impedes community work. On the other hand, big landowners often live in towns part of the time, and send their children to urban schools, rather than investing in community projects near their farms.

The regression analysis confirms these patterns in most cases. The proportion of the population primarily working for wages is negatively related to communal investment except in hot country, where wageworkers are more likely to be unionized or partly urbanized. Elsewhere, the farmer invests more than the hired hand. A variable representing the proportion owning three hectares

or more has a negative sign in the general regression, indicating that most investment occurs where plots of less than this size are prevalent. However, the proportion owning at least three hectares is positively related to the local contribution. This effect is strongest in intermediate climates, where farms larger than this are likely to be medium-sized, owner-operated coffee farms. In hot and cold regions, however, the variable may bring in the negative influence of much larger farms.

A final economic variable which might presumably have an influence on community investment is income. Unfortunately, it could not be measured directly. Insofar as income is related to land tenure, occupation and market orientation, it would appear to have a positive effect. A possible proxy for income, although an imprefect one, is the level of development of tangible community facilities. Communities were ranked according to their available services using Young's (1966) "scale of differentiation." The Scale included the following facilities (listed from the most common to the least): a school, a store or bar, a sports field, water or electricity, a butcher (or other specialized store), a chapel, a police station, a bus stop, a doctor, a telephone, a market, a movie theater, and a municipal government. These formed a Guttman Scale of communities with a coefficient of reprodcibility of .94. Communities scaled at the different levels were then grouped into six wider categories. The lowest LVO included communities with no services or only a school; the highest LV6 included communities at the highest scale levels: those with a market, a movie or a municipal government. Dummy variables for all but the lowest level were added to the regression and increased the value of R^2 in the overall regression from .349 to .380 (Appendix, column 4). However, none of the individual coefficients is significant. The estimated values, insofar as they can be trusted, indicate that communities at the lowest levels of development (LVo, LVI) and at the very highest level (LV6), invested the most.

Those in the middle brackets invested less. This may indicate a complex relation of investment to income, under which either a strong desire to invest (at lowest levels) or a greater ease of investment (at highest levels) is better than a moderate degree of both, but it may also be due to the nature of the investment involved. Communities at lower levels are those lacking in just those investments as are most easily made by community action, as that system is now constituted in Colombia: roads, schools, water supply systems and athletic fields. Investments at intermediate levels, such as health posts, police stations and churches, can be made, but are much more costly and less apt to receive aid, require the collaboration of outside specialists, be they doctors, policemen or priests, for their use, and are, in general, subject to lower rates of return. Investments at the highest levels may, again, be made through community action when larger villages, particularly those which are seeking municipal status, mobilize their efforts, or when small-town mayors can manipulate community action boards for town projects. But in general, Acción Communal is largely a program of communities that are poor in services, as well as in land ownership.

F. GOVERNMENT SUBSIDIES TO COMMUNITY PROJECTS

The most obvious economic factor to influence community projects is the availability of outside financial support. National, regional and municipal governments, and such other groups as the National Federation of Coffee Growers, provide more than half of the funds spent on projects constructed under the auspices of community boards. If communities go through any sort of economic comparison of costs and benefits of possible projects, it is clear that subsidies available to cover part of the cost will make more projects desirable and increase the amount of construction. If the amount of money contributed by communities is subject to some absolute limitation due to subsistence needs, and projects have minimum sizes, the effect will be reinforced. On the other

hand, if only psychological factors governed the amount of construction, then government subsidies might leave the amount contributed by the communities unaffected, or perhaps even substitute for community funds.

An analysis of investment taking community and government contributions separately is made in Table V of the appendix. Either contribution is explanable by the variables used above in Table II, with similar degrees of significance and in most cases, similar coefficients, although a few variables, such as market orientation and concentration of population appear to act principally on aid received, while others, notably the Violence, seem mostly to affect the local contribution. When a variable for aid received is added to the explanation of the local share, however, it increases R^2 from .27 to .39, while decreasing the effects of other variables. The highly significant positive effect of this variable might be taken to indicate that aid is the principal determinant of the community's effort. However, this may be an erroneous inference: community factors explain a large part of the variation in government subsidies, and adding local investment to the explanation of aid also increases R^2 from .32 to .43, while diminishing the effect of the other variables. This is so because government allocation of funds is affected by pressure exerted by the communities, which, in turn, like community cash and labor contributions, will be determined by the incentives and social factors already considered. The community investments themselves also draw some matching funds. Clearly, there is simultaneity in the system of causation, and this may severly bias the regression estimates of the own and aid shares of investment when taken separately.

Because of the problem of simultaneity, two-stage least squares estimates have been made and are presented in Table III. This procedure eliminates the estimation bias, but does not alter greatly the estimated effects of the explanatory variables included. However, to allow identification, it has been assumed that some of the variables affect only the local or government aid contributions

TABLE III

Two-Stage Least Squares Estimates of Effects on Local and Government Contributions to Community Board Projects

$$\text{OWNF} = \underset{(1.62)}{113} + \underset{(1.83)}{.23\ \text{AIDF}} + \underset{(.97)}{14\ \text{PROM}} - \underset{(1.94)}{119\ \text{LABR}}$$

$$+ \underset{(3.05)}{95\ \text{VIOL}} - \underset{(1.29)}{7\ \text{WAGE}} + \underset{(.81)}{48\ \text{RAD}} - \underset{(.81)}{5\ \text{HOUR}}$$

$R^2 = .376$ d.f. = 88

$$\text{AIDF} = \underset{(.02)}{2} + \underset{(2.31)}{.94\ \text{OWNF}} + \underset{(1.36)}{29\ \text{PROM}} - \underset{(.89)}{101\ \text{LABR}}$$

$$- \underset{(2.53)}{217\ \text{FARM}} + \underset{(1.50)}{159\ \text{MKT}} + \underset{(1.96)}{118\ \text{KONS}} - \underset{(1.33)}{13\ \text{FAMS}}$$

$R^2 = .408$ d.f. = 88

Symbols and sources same as for Table II.

to investments. These assumptions have been based on the significance of the variables in the regressions of Table V. It must be concluded from the two-stage analysis that local and government shares are simultaneously determined and that for most purposes more can be gleaned from the explanations of total investment (Table II above) than from disaggregated estimates. However, the analysis does rule out the possibility that aid substitutes for and reduces community contributions, and it provides an estimate of the marginal effect of aid on local investments. The estimated relation is that each additional peso of aid yields one-quarter of a peso in additional community contributions. This may be contrasted with the average relationship, of 0.80 pesos of local funds for each peso of aid.

The conclusion of this analysis, that subsidies can induce further investment, but that their existence does not obviate the separate importance of local factors, can be illuminated by some individual cases included in the sample. It was found, for example, that better work often took place when funds had been obtainable only with some effort by the communities, instead of being either impossible to obtain or given with no prior local planning or requests.[6] In some cases, in fact, funds appropriated by the Colombian Congress for communities without operative Juntas or with no expressed interest in projects, have been left unclaimed. Available funds will not alone ensure response (although on the average a response of one-fourth the subsidy may be expected). But on the other hand, cases can be cited in which promotional effort combined with the promise of funds led to the organization of local groups and the completion of projects. And where local groups have sought funds and received them, schools have been built at times in a manner of weeks. Clearly there is some elasticity of local effort with respect to government subsidy, but not infinite elasticity.

G. CONCLUSIONS

The regression analysis of inter-communal variations in investment in local public works projects managed by the Juntas de Acción Comunal indicates that both economic incentives and differences in social conditions and communications affect this level of investment. Neither a simple maximization hypothesis nor the claim that maximization is irrelevant will predict as successfully as a mixed hypothesis. Due to the limitations of the data and of the multiple regression method, it is not possible to trace all of the interactions between variables, but it appears probable that the specialization of communities in commercial agriculture and the degree to which residents have sources of income other than wage work, are factors affecting growth through the economic ability or incentive to invest, as is government subsidy, while exposure to promotion or to the Violence, nearness to cities and perhaps the possession of radios are factors increasing the readiness to invest at a given level of expected returns.

The analysis can also shed some light on optimal policy to increase community investment. The government can concentrate on improving the incentive to invest (as through subsidies) or the readiness to invest (through more promotion). From the regressions it appears that for each year of promotion, some 14 pesos per family are invested locally. A promotor's salary in the period considered was about 20,000 pesos a year, and he will normally work with about 1500 families. Taking this estimate, it appears that the promotor's pay will yield roughly its equal in local investment. On the other hand, the marginal effect of a peso in subsidies is to induce another quarter of a peso to be added by the community to the original peso, yielding projects costing 1.25 times the original government grant since the subsidies are also invested.[7] These marginal returns would seem to indicate a slight edge for subsidies. However, not all of the effects are felt within the first year or two. The effects

of promotion in previous years were greater than those of current promotion in some versions of the regression analysis in which investment was disaggregated by years. Therefore, the marginal return to promotion will be considerably higher than calculated if delayed effects are considered. Returns to direct subsidy should also be adjusted upward, however, since present investment itself, including the subsidy share, seems to have positive learning-by-doing effects. The exact magnitude of this effect as opposed to the results of promotion cannot be measured without information on communities over longer time periods than can be considered here. But given the fairly narrow range by which direct effects of subsidies exceed those of promotion , and the obvious interactions between the success of promotion and the demand for subsidies, it would appear that the two forms of public support are roughly in balance at present, and that expansion of the community-action program should also involve increases in both promotion and subsidies.

APPENDIX: TABLE IV

Regression Coefficients: Factors Affecting Community Investment

Regression	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	TINF	TINF	TINF	TINF	TINF	TINF
Independent Variable						
C	126	122	89	155	138	163
VIOL	181**	201**	172**	192**	175**	176**
FAMS	-30**	-31**	-29**	-38**	-37**	-30**
PROM	80**	82	81**	73**	69**	...
KONS	223**	231**	251**	261**	284**	268**
HOUR	-24*	-23*	-24*	-27*	-34**	-70
RAD	...	197*	189	199*	171	165
MKT	287*	329**	336*	414**	459**	449*
FARM	-200*	-182*	-190*	-195*	-156	-142
LABR	-286*	-315*	-307*	-280*	-186	-188
WAGE	...	-15	-9	-17	-19	-9
LV1	...	...	...	44	47	2
LV2	...	...	...	-120	-114	48
LV3	...	...	...	-2	10	-106
LV4	...	...	...	-102	-91	12
LV5	...	...	...	36	8	-91
HOT	...	...	-73	...	-166*	-162*
COLD	...	...	-1	...	-59	-70
COF	...	...	...	...	-145	-153
LIT	...	...	...	...	50	33
KMS	...	...	...	...	2	2
PR65	...	...	...	...	...	29
PR64	...	...	...	...	...	90
PRPR	...	...	...	...	...	82
R^2	.33	.35	.36	.38	.39	.41
d.f.	87	85	83	80	75	73

Sources and Definitions of variables same as Table II, except that PR65, PR64 and PRPR refer to years of promotion received in 1965, 1964 and previous years respectively. Coefficients starred once: $t > 1.30$; starred twice: $t > 2.00$.

TABLE V

Regression Coefficients: Factors Affecting Community Investment

Regression	(7)	(8)	(9)	(10)	(11)	(12)
Dependent Variable	OWNF	OWNF	OWNF	OWNF	AIDF	AIDF
Independent Variable						
C	93	82	85	81	29	-31
VIOL	112**	92**	89**	71**	89*	15
FAMS	-8*	-7	-2	-1	-22**	-17*
PROM	27**	26**	13	12	55**	37*
KONS	61*	72*	17	27	170**	130**
HOUR	-9*	-9*	-5	-5	-14*	-8
RAD	81	76	51	47	115	62
MKT	85	83	22	18	243**	187*
FARM	24	15	77*	67	-206**	-222**
LABR	-119*	-120*	-69	-73	-195*	-117
WAGE	-11*	-7	-10*	-7	-4	3
LV1	...	...	...	...	...	...
LV2	...	...	...	...	...	...
LV3	...	...	...	...	...	...
LV4	...	...	...	...	...	...
LV5	...	...	...	...	...	...
HOT	...	-48	...	-42	...	...
COLD	...	-11	...	-14	...	...
COF	...	...	...	...	...	...
AIDF	...	...	.25**	.25**	...	...
OWNF	...	...	...	...	...	.65**
R^2	.26	.27	.39	.39	.32	.43
d.f.	85	83	84	82	85	84

Sources and Definitions same as Table II.

TABLE VI

Regression Coefficients: By Regions

	Hot Climate		Intermediate Climate		Cold Climate	
Regression	(13)	(14)	(15)	(16)	(17)	(18)
Dependent Variable	TINF	OWNF	TINF	OWNF	TINF	OWNF
Independent Variable						
C	-492	111	403	197	21	69
FAMS	-71**	-10	-17	-1	-10	-5
VIOL	94	28	217*	137**	161	102
PRGM	106*	36**	60	14	88*	44*
RAD	386*	-29	-47	42	262	-72
KONS	291	-81	331**	133*	-1	-35
HOUR	-30	-1	-49*	-24	-34	-18
LABR	173	25	-310	-146	-34	-44
FARM	-501	-62	-73	14	-272	-3
MKT	433	-44	397	205*	263	-198
WAGE	22	3	4	8	---	---
COF	---	---	-295*	-148*	---	---
R^2	.45	.36	.43	.31	.49	.32
d.f.	17	17	36	36	10	10

Sources and Definitions same as Table II.

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FOOTNOTES

*This paper is based on research carried out in Colombia in 1966. A preliminary version of the calculation presented appeared in my doctoral dissertation. I would like to thank the Foreign Area Fellowship Program for supporting the field research; Professors R.A. Berry, L.G. Reynolds, C.W. Reynolds, H. Felstehausen, and J.R. Harris for their comments; and in particular, the many Colombian village leaders and officials whom I interviewed for their cooperation.

[1]For other combined descriptions of adoption of rural innovations see Berry (1967) and Edel (1967).

[2]Reliability of such interview data is discussed in Young and Young (1961).

[3]A similar result can be ascertained from figures for percapita investment at the departmental level, from the numbers of Juntas in each department, and from attitudes reported in a government survey (Triana y Antorveza, 1966).

[4]Evidence of vereda organization during the Violence is found in Guzman Campos, Fals Borda and Umaña Luna (1964), vol. II, pp. 92-96. This work is the standard history of the Violence.

[5]Population has a negative coefficient if investment per family is used as the dependnet variable, and a positive sign if total investment per community is used. Larger communities build larger, but not proportionately larger, projects.

[6]Edel (1968). Chapter IV presents several cases: One example of the inefficacy of donations without local demand was the pilot project of the School-to-School program, under which American PTA's provide the materials for construction of schools by Colombian communities. When this program was first established, the Peace Corps was forced to choose a pilot community rapidly, in order that a number of dignitaries could attend a ground-breaking ceremony on schedule. The community selected, a highland village, was one of the veredas of a municipality in which Peace Corps volunteers were working. The community had just built a schoolroom for the second grade, severely taxing its fund raising capacity in the process. Although other veredas in the municipality were still trying to build their first school, this vereda was somehow chosen for the project.

For the village, the donation came as a complete surprise. A number of officials showed up, along with the American Ambassador's wife, to offer them aid in the construction of a school. The Ambassador's wife gave a 200 pesos contribution toward the holding of a fundraising bazaar; a hacienda owner agreed to donate a plot of ground for the school; and the community formally accepted the obligation to collaborate with labor. They did work on the school in their idle moments thereafter, but never at a rapid pace. And they always thought of the school as the Americans' gift. Instead of being completed in a few months, as the Peace Corps expected, it took two-and-a-half years to build. And in the process, the Americans donated $2500, instead of the $1000 they expected to spend. Not responding may have been the best form of maximization for the village, if they guessed, correctly, that the outsiders would have a stake in completing the school.

[7]Additional returns must also be considered, including the additional cost saving through avoidance of less efficient construction by the government or contractors, and the effects of learning-by-doing on later community investment or innovation. The real rate of return, including only direct effects, of projects constructed by community boards, has been estimated at 12-18% (Edel, 1968).

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